

# Multi-line systems

for grease (also suitable for oil)

## APPLICATION

Using the multi-line system, centralised lubrication systems can be used for lubricating individual machines and small groups of machines or appliances. In the multi-line system, the lubricant is delivered by the pump in metered quantities through several outlets. Each lubrication point is connected to the pump by its own line.

### 1. Maximum number of lubrication points

The design of the lubrication pumps, limits the maximum number of lubrication points which can be supplied by direct line 32.

A further increase in the number of lubrication points is possible if progressive distributors are used (see page 2).

### 2. Maximum length of line

The maximum permissible length of line from the pump to any lubrication point depends on the characteristics and pumpability of the grease, the size of the feed line, the delivery pressure of the pump, the rate of flow and the operating temperature, and as a rule from 20 to 40 m is acceptable. If the lines are too long, the line resistance will exceed the pump pressure.

### 3. Pumps

For lubrication by the multi-line system, three types of pump in various sizes are available.

#### 3.1 Pumps type TB - D . . .

are single plunger pumps operated by hand lever or pneumatically. In the hand-lever type, pulling the lever raises the plunger and forces the grease into all lines. Fresh grease is drawn in by the plunger during the return stroke.

The pneumatically-operated pumps type TD - D have a compressed air cylinder flange-mounted to the pump. Actuation is via a push-button or limit switch on the machine to be lubricated or by timer energizing a solenoid valve in the compressed air line.

To avoid caving in of the grease the reservoir is equipped with a floating disc.

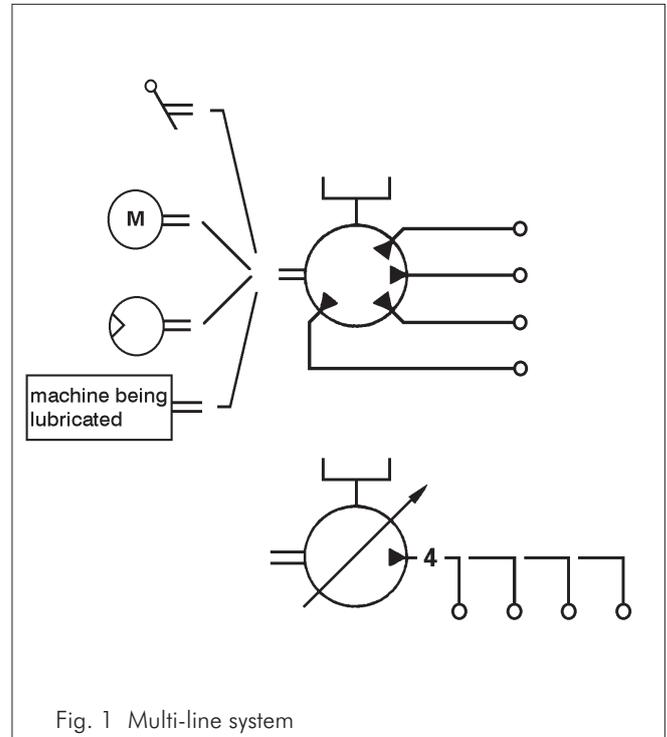


Fig. 1 Multi-line system

#### 3.2 Pumps type FZ - A . . .

are driven either by the machine to be lubricated or by an electric motor. They employ a positively - controlled differential piston. The pump has up to 12 outlets. Delivery is variable by adjusting the plunger stroke via an adjusting spindle.

The grease reservoir of type FZ - is fitted with agitators to scrape the grease from the reservoir walls and to avoid caving-in of the grease.

Pumps type FZ - are also suitable for use as oil pumps.

#### 3.3 Pumps type ZP 3000 - 6000 . . .

in various design versions are used for direct lubrication in multi-line systems (one delivery element per lubricating point). The grease pump can be manufactured with one pumping mechanism (ZP 3000 and ZP 4000) having max. 8 outlets and/or with one or two pump mechanisms (ZP 5000 and ZP 6000) having max. 16 or 32 outlets.

### 4. Drive

Pumps type FZ - are available at choice for oscillating lever drive, for rotary drive with or without reduction gearing and with flanged motor.

The drive of the pumps ZP 3000 to 6000 is effected via oscillating lever, free shaft end or electric motor.

## 5. Progressive distributors

The number of lubrication points which can be supplied by one pump can be increased by the use of progressive distributors E 4. The E 4 distributors are available with two, three or four outlets. By using the distributor, lubricant delivered from the pump is fed to the lubrication points connected to the distributor in sequence, so that each lubrication point receives only a half, a quarter, and so on, of the quantity of the lubricant delivered by the pump into the corresponding feed line. Each outlet of the divider receives  $0.4 \text{ cm}^3$  per stroke.

Outlet branches enable any two of the four connections to be combined into one outlet, so that the lubrication point connected to this outlet receives double the lubricant to the remaining lubrication points connected to the distributor.

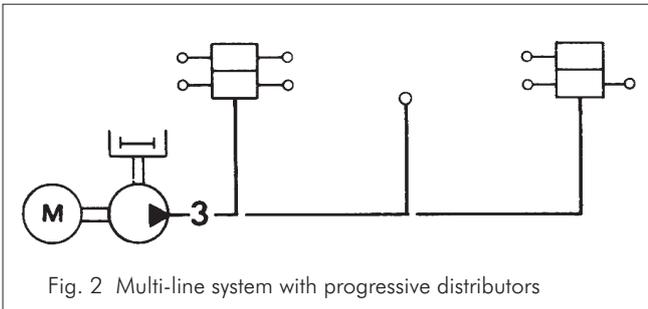


Fig. 2 Multi-line system with progressive distributors

## 6. Automatic operation

Multi-line systems are operated for the most part with small delivery quantities in continuous service. In many cases this is done by driving the pump through a moving part of the machine to be lubricated, either by oscillating lever, coupling or chain. This has the advantage that the pump only works when the machine to be lubricated is in motion.

In the case where a motor-driven pump is required to deliver only when the machine to be lubricated is in operation, the motor contactor of the pump should be wired downstream of the contactor of the lubricated machine.

An electrical timer enables variable operating times up to 1 hour and intervals up to 6 hours to be preset. This adapts the lubricating cycle to operating conditions.

## 7. Spray lubrication

Multi-line systems are also suitable, under certain conditions, for spraying gears, slides and similar applications where larger areas are to be lubricated.

Bearings, as well, with the help of a spray system, as gears or other exposed areas can be simultaneously lubricated by one pump. In practice however, it is often decided to use different lubricants for bearings and gears, so that in these cases separate lubrication systems are required.

The pneumatically-operated pumps type TB - D are especially economical for spray systems (Fig. 4).

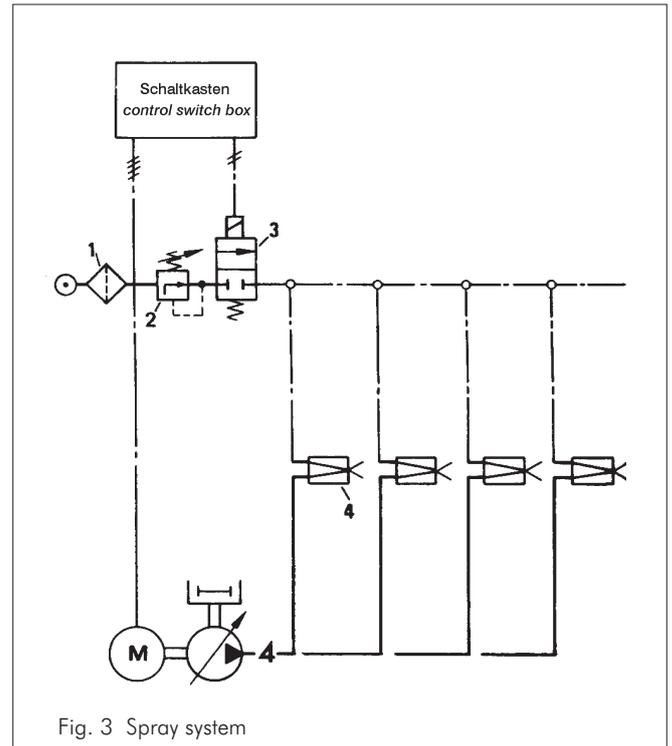


Fig. 3 Spray system

The compressed air necessary for spraying is purified by an air filter (1), regulated by an air regulator (2) and passed to the spray nozzles (4) via a solenoid valve (3).

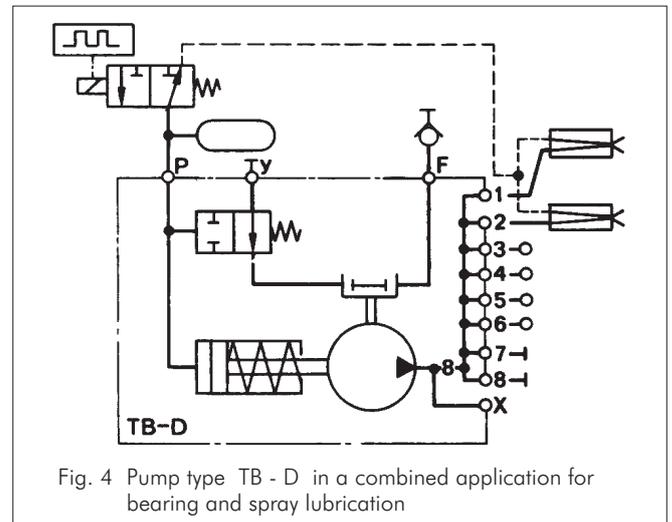


Fig. 4 Pump type TB - D in a combined application for bearing and spray lubrication

## 8. Pumps type view

Type	Number of outlets	usable reservoir capacity l	max. delivery pressure bar	max. delivery volume per outlet	Drive	Power required kW	Outlet size	Adjustment delivery volume
TB - D	1 up to 8	0.25 0.65	25	for each lever actuation or pneumatic pulse 0.5 cm <sup>3</sup>	manual	—	thread hole LL 6 W DIN 3854 for 6 mm pipe	The delivery volume is not adjustable
	1 up to 9	1.6 4.0	100		pneumatic	max. air pressure 5 bar		
FZ - A	1 up to 12	2.5 6 10	—	0.1 cm <sup>3</sup> /per stroke 36 cm <sup>3</sup> /h	by oscillating lever or driveshaft (from the lubricated machine) or electric motor	0.18	G 1/4 female thread cylinder	Quantity adjustable individually for 1 up to 6 outlets and with 7 up to 12 outlets for each 2 outlets placed vertically over each other
FZ - B	1 or 2							
ZP								
3000	1 to 8	2, 3, 5	160	0 ...0.2ccm/ per stroke	drive by oscillating lever, free end stud or electricmotor	0.12	M 12 x 1.5	The rate of delivery can be set infinitely.
4000	1 to 8	5, 10				0.18	M 14 x 1.5	
5000	1 to 16	5, 10, 20, 30				0.18	M 14 x 1.5	
6000	1 to 32	10, 20, 30				0.37	M 14 x 1.5	



### Details see printlets:

Pump TB-D: P\_2005\_1\_GB\_TBD H  
P\_2005\_1\_GB\_TBD P

Pump FZ-A: P\_2005\_1\_GB\_FZA

Pump FZ-B: P\_2005\_1\_GB\_FZB

Pumpe ZP 3000: P\_2006\_1\_GB\_ZP3000

Pumpe ZP 4000: P\_2006\_1\_GB\_ZP4000

Pumpe ZP 5000: P\_2006\_1\_GB\_ZP5000

Pumpe ZP 6000: P\_2006\_1\_GB\_ZP6000

